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CLAIMS

What is claimed is:

1. (Currently amended) A system for controlling a thin film deposition process, comprising:
  - one or more thin film deposition components operative to deposit a thin film on one or more portions of a wafer;
  - a thin film deposition component driving system for driving the one or more deposition components;
  - a system for directing light on to the deposited thin film and collecting light reflected from the deposited thin film;
  - a monitoring system adapted to detect structural irregularities associated with the deposited thin film by comparing reflected light data associated with the deposited thin film with a database comprising known thin film reflected light signatures; and
  - a processor operatively coupled to the monitoring system and the thin film deposition component driving system, wherein the processor is operatively coupled to a non-linear training system which facilitates the processor in determining deposition parameter adjustments to the one or more deposition components according to the received data. ~~the processor receives data from the monitoring system and communicates deposition parameter adjustments to the one or more deposition components according to the received data using feedback control.~~
2. (Original) The system of claim 1, the monitoring system comprising a scatterometry system for processing the light reflected from the thin film.
3. (Original) The system of claim 2, wherein structural irregularities associated with the thin film includes at least one of pinholes, depressions, air bubbles, bumps, voids, agglomerates, large grains, second phase compositional variations and impurities, or a combination thereof.

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4. (Original) The system of claim 2, wherein the processor determines the presence of an unacceptable thin film deposition condition for at least a portion of the wafer according to the data received from the monitoring system.

5. (Original) The system of claim 2, wherein the deposition parameter adjustments comprise at least one of thickness, uniformity, rate of deposition, pressure, flow rates of reacting species, flow rate of carrier gas and temperature or a combination thereof.

6. (Cancelled)

7. (Original) The system of claim 2, wherein the processor partitions the mask into a plurality of grid blocks and makes a determination of deposition conditions at the one or more grid blocks.

28. (Currently amended) A method for monitoring and controlling the deposition of a thin film, comprising:

- depositing a thin film on a wafer;
- directing a light onto the thin film;
- collecting a light reflected from the thin film;
- employing scatterometry means to analyze the reflected light to determine one or more properties of the thin film;
- monitoring structural irregularities associated with the deposited thin film by comparing reflected light data associated with the deposited thin film with a database comprising known thin film reflected light signatures; and
- controlling a deposition component to deposit thin film on the wafer by utilizing a non-linear training system which facilitates determining deposition parameter adjustments according to the properties of the thin film.

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29. (Original) The method of claim 28, wherein the properties include at least one of thickness, uniformity, presence of defects, and presence of impurities or a combination thereof.

30. (Original) The method of claim 29, further comprising using a processor to control the at least one deposition component based at least in part on data received from the scatterometry system.

35. (Currently amended) A method for regulating a process for depositing a thin film, comprising:

- using one or more deposition components to deposit a thin film;
- determining the characteristics of the deposited thin film utilizing reflected light and comparing to known thin film reflected light signatures; and
- using a processor operatively coupled to a non-linear training system to coordinate control of the one or more deposition components to deposit subsequent thin film.

36. (Currently amended) A system for regulating a process for depositing a thin film, comprising:

- means for using one or more deposition components to deposit a thin film;
- means for determining the acceptability of the thin film deposition utilizing reflected light and comparing to known thin film reflected light signatures; and
- means for using a processor operatively coupled to a non-linear training system to coordinate control of the one or more deposition components to deposit the thin film.